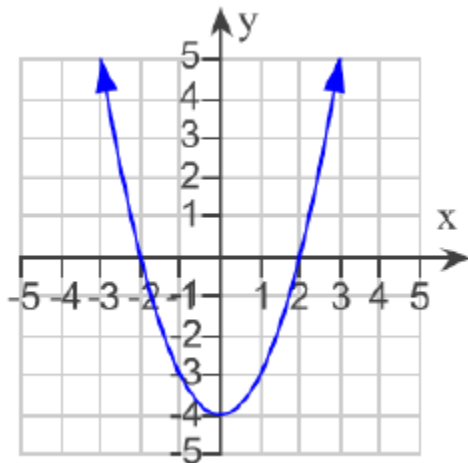
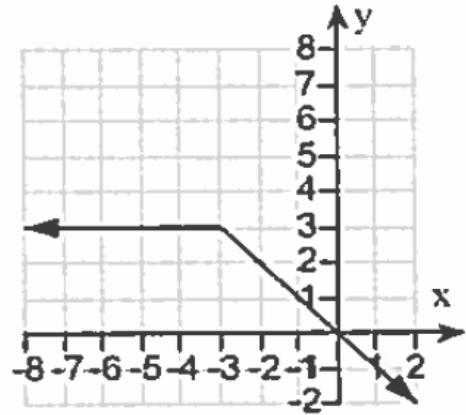


# SE MRC College Algebra Content Review

## More on Functions and Their Graphs Section 2.2

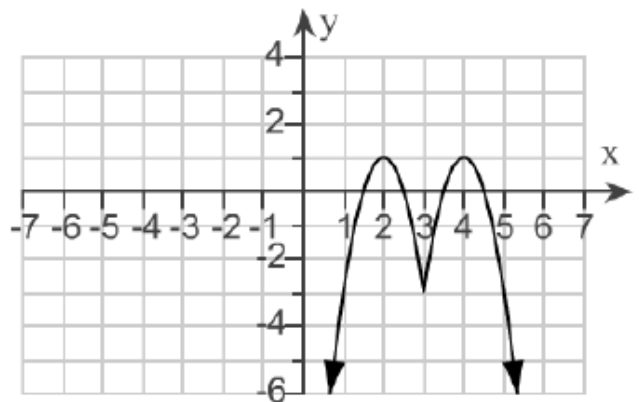
### Learning Objectives:

1. Identify intervals on which a function increases, decreases, or is constant.
2. Use graphs to locate relative maxima or minima.
3. Identify even or odd functions and recognize their symmetries.
4. Understand and use piecewise functions.
5. Find and simplify a function's difference quotient.

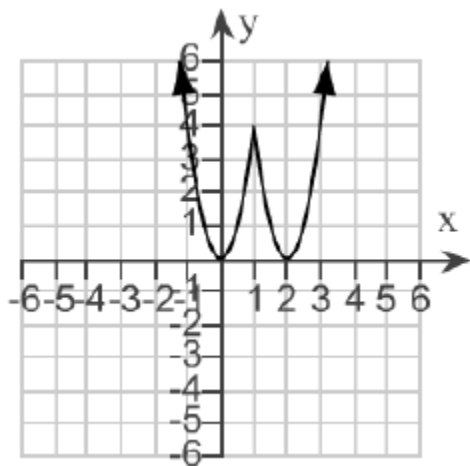


1. Use the graph to determine:
  - a. The function is increasing on the interval(s) \_\_\_\_\_.
  - b. The function is decreasing on the interval(s) \_\_\_\_\_.
  - c. The function is constant on the interval(s) \_\_\_\_\_.

2. Use the graph to determine:
  - a. The function is increasing on the interval(s) \_\_\_\_\_.
  - b. The function is decreasing on the interval(s) \_\_\_\_\_.
  - c. The function is constant on the interval(s) \_\_\_\_\_.



3. Use the graph to determine:
  - a. The function is increasing on the interval(s) \_\_\_\_\_.
  - b. The function is decreasing on the interval(s) \_\_\_\_\_.
  - c. The function is constant on the interval(s) \_\_\_\_\_.



4. Use the graph to determine:
- The function is increasing on the interval(s) \_\_\_\_\_.
  - The function is decreasing on the interval(s) \_\_\_\_\_.
  - The function is constant on the interval(s) \_\_\_\_\_.

5. Determine if the function is even, odd, or neither.

$$f(x) = x^9 + x^3$$

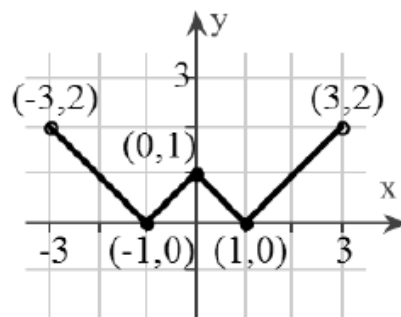
6. Determine if the function is even, odd, or neither.

$$g(x) = x^{10} + x^3$$

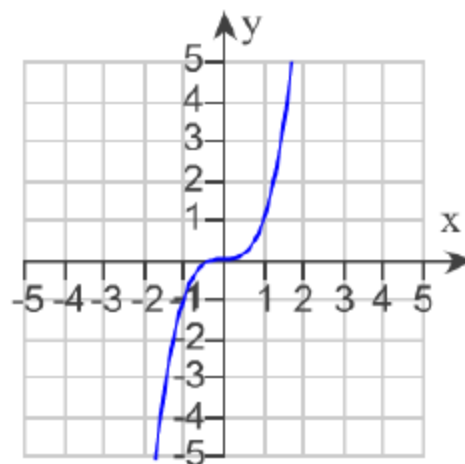
7. Determine if the function is even, odd, or neither.

$$h(x) = x^2 - x^{12}$$

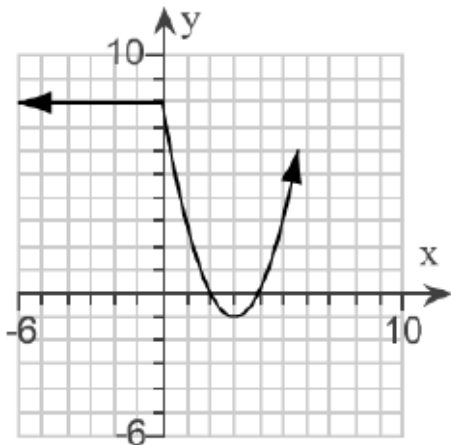
8. Use the given graph of the function  $f$ , find whether the function is even, odd, or neither.



9. Use possible symmetry to determine whether it is the graph of an even function, an odd function, or a function that is neither even nor odd.



10. Use the graph to find the following.



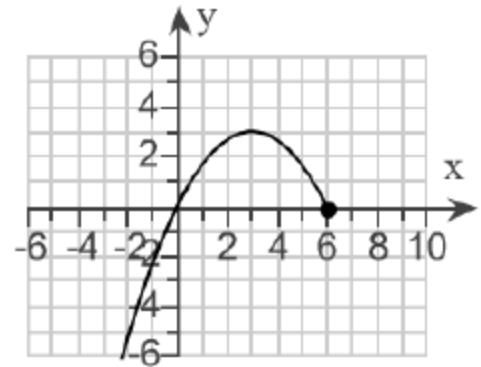
- The domain of  $f$  \_\_\_\_\_
- The range of  $f$  \_\_\_\_\_
- The x-intercepts \_\_\_\_\_
- The y intercepts \_\_\_\_\_
- Intervals on which  $f$  is increasing  
\_\_\_\_\_
- Intervals on which  $f$  is decreasing  
\_\_\_\_\_
- Intervals on which  $f$  is constant  
\_\_\_\_\_
- The number at which  $f$  has a relative minimum \_\_\_\_\_
- The relative minimum of  $f$  is  
\_\_\_\_\_
- $f(-4) =$  \_\_\_\_\_
- $f(x) = 3$  \_\_\_\_\_
- Is  $f$  even, odd, or neither?  
\_\_\_\_\_

11. Evaluate the piecewise function at the given values of the independent variable.

$$f(x) = \begin{cases} 5x + 4 & \text{if } x < 0 \\ 4x + 6 & \text{if } x \geq 0 \end{cases}$$

- $f(-1) =$  \_\_\_\_\_
- $f(0) =$  \_\_\_\_\_
- $f(1) =$  \_\_\_\_\_

12. Use the graph of  $f$  to determine each of the following.



- The domain of  $f$  \_\_\_\_\_
- The range of  $f$  \_\_\_\_\_
- The zero(s) of  $f$  \_\_\_\_\_
- $f(5.5) =$  \_\_\_\_\_
- Intervals on which  $f$  is increasing  
\_\_\_\_\_
- Intervals on which  $f$  is decreasing  
\_\_\_\_\_
- The values for which  $f(x) \leq 0$   
\_\_\_\_\_
- The relative maximum or minima  
\_\_\_\_\_
- The value(s) of  $x$  for which  $f(x) = 3$   
\_\_\_\_\_
- Is  $f(4)$  positive or negative?  
\_\_\_\_\_

13. Evaluate the piecewise function at the given values of the independent variable.

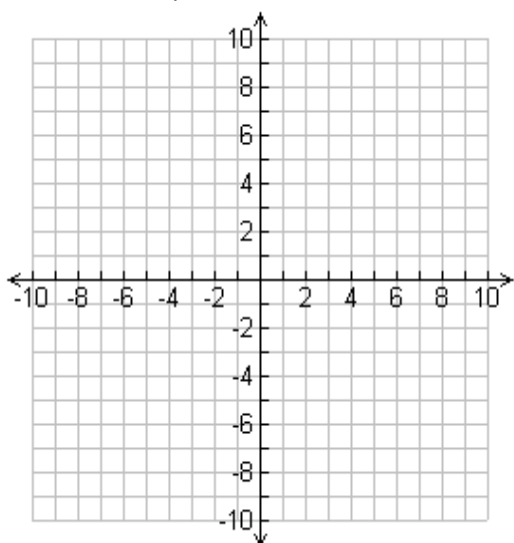
$$g(x) = \begin{cases} x + 5 & \text{if } x \geq -5 \\ -(x + 5) & \text{if } x < -5 \end{cases}$$

- $g(0) =$  \_\_\_\_\_
- $g(-7) =$  \_\_\_\_\_
- $g(1) =$  \_\_\_\_\_

14. The domain of the piecewise function is  $(-\infty, \infty)$ .

$$f(x) = \begin{cases} x + 5 & \text{if } x < -2 \\ x - 5 & \text{if } x \geq -2 \end{cases}$$

- a. Graph the function.

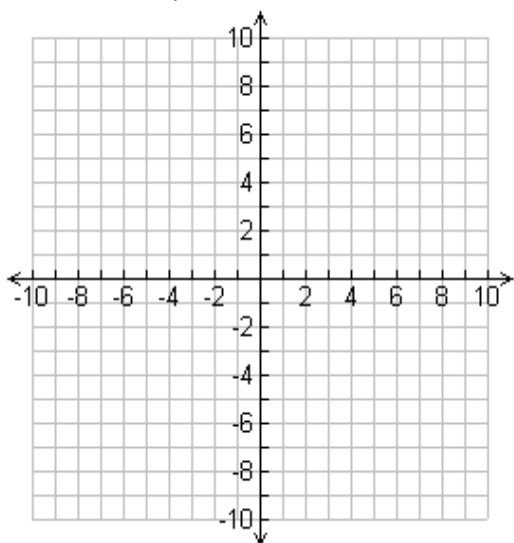


- b. Use your graph to determine the function's range. \_\_\_\_\_

15. The domain of the piecewise function is  $(-\infty, \infty)$ .

$$f(x) = \begin{cases} \frac{1}{4}x^2 & \text{if } x < 3 \\ 4x - 7 & \text{if } x \geq 3 \end{cases}$$

- a. Graph the function.

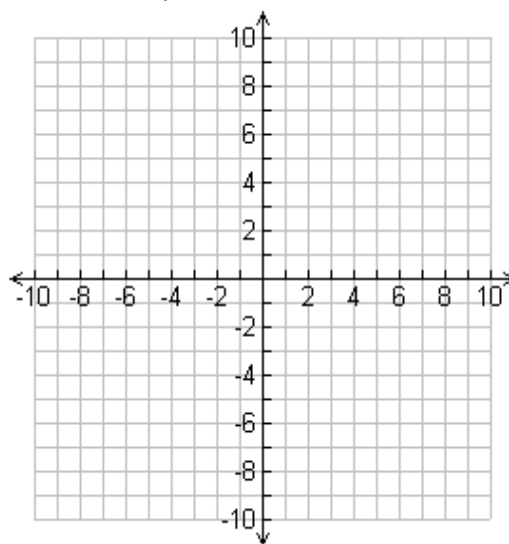


- b. Use your graph to determine the function's range. \_\_\_\_\_

16. The domain of the piecewise function is  $(-\infty, \infty)$ .

$$f(x) = \begin{cases} 0 & \text{if } x < -4 \\ -x & \text{if } -4 \leq x < 0 \\ x^2 & \text{if } x \geq 0 \end{cases}$$

- a. Graph the function.



- b. Use your graph to determine the function's range. \_\_\_\_\_

17. Find the difference quotient of  $f$ ; that is, find  $\frac{f(x+h)-f(x)}{h}$ ,  $h \neq 0$ , for the following function.

$$f(x) = 4x + 4$$

19. Find the difference quotient of  $f$ ; that is, find  $\frac{f(x+h)-f(x)}{h}$ ,  $h \neq 0$ , for the following function.

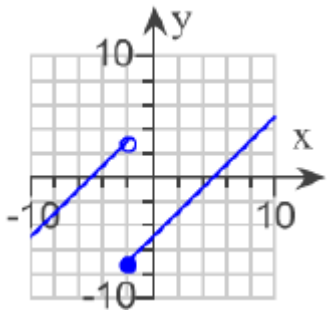
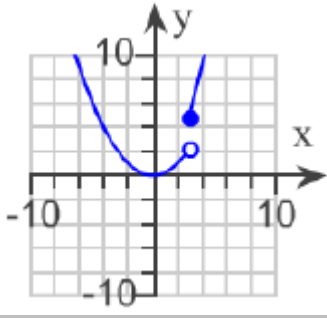
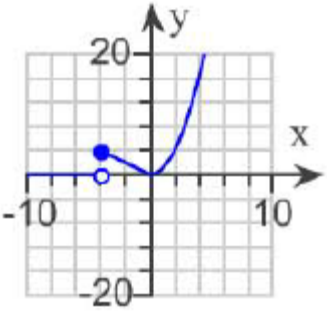
$$f(x) = 2x^2 + x - 3$$

18. Find the difference quotient of  $f$ ; that is, find  $\frac{f(x+h)-f(x)}{h}$ ,  $h \neq 0$ , for the following function.

$$f(x) = x^2 - 6x + 4$$

ANSWER KEY:

1.	a.	$(0, \infty)$
	b.	$(-\infty, 0)$
	c.	NONE
2.	a.	NONE
	b.	$(-3, \infty)$
	c.	$(-\infty, -3)$
3.	a.	$(-\infty, 2) \cup (3, 4)$
	b.	$(2, 3) \cup (4, \infty)$
	c.	NONE
4.	a.	$(0, 1) \cup (2, \infty)$
	b.	$(-\infty, 0) \cup (1, 2)$
	c.	NONE
5.		ODD
6.		NEITHER
7.		EVEN
8.		EVEN
9.		ODD
10.	a.	$(-\infty, \infty)$
	b.	$[-1, \infty)$
	c.	$(2, 0), (4, 0)$
	d.	$(8, 0)$
	e.	$(3, \infty)$
	f.	$(0, 3)$
	g.	$(-\infty, 0)$
	h.	$x = 3$
	i.	$y = -1$
	j.	8
	k.	$x = 1, x = 5$
	l.	NEITHER
11.	a.	-1
	b.	6
	c.	10
12.	a.	$(-\infty, 6]$
	b.	$(-\infty, 3]$
	c.	$(0, 0), (6, 0)$
	d.	1
	e.	$(-\infty, 3)$
	f.	$(3, 6)$
	g.	$(-\infty, 0] \cup \{6\}$
	h.	$(3, 3)$
	i.	3
	j.	POSITIVE
13.	a.	5
	b.	2
	c.	6

14.	a.	
	b.	$(-\infty, \infty)$
15.	a.	
	b.	$[0, \infty)$
16.	a.	
	b.	$[0, \infty)$
17.		4
18.		$2x + h - 6$
19.		$4x + 2h + 1$